Network Analysis

Based on the model analysis, eleven sketch networks were developed to look at ways of providing needed transportation infrastructure to serve the future land uses. These were based on input received from the Planning Commission and the MPO Technical Committee. Of the alternatives analyzed, there were minimal differences between them. The one major factor that this analysis pointed out is that while at the current time (based on the 2004 Calibrated model) the average trip time is 7.9 minutes, the 2030 land use and networks will increase that to a range of between 13.4 to 14.1 minutes.

In order to assist in analyzing the various networks, a benefit to cost analysis was performed. The basis of this comparison was using the 2030 traffic on the 2004 network. The benefits derived in each case were savings in motorist time and vehicle operating costs versus the overloaded 2004 network. The analysis looked at the benefits of each alternate and then compared them to the costs for building the improvements detailed in each of the networks. While none of the alternative networks greatly stood out from the others based on this analysis, The Continuing Growth Base Network (CGBN) had the highest benefit to cost ratio. The existing 2025 Comprehensive Plan network was also one of the most highly rated ones. It should be noted that these benefits as noted are for the year 2030 only. The fact that the B/C ratio is less than one would not be the case if you were to look at the benefits over the life of the 2030 transportation plan.

A “cost per lane mile” calculation was performed to determine if any of the alternatives showed a greater efficiency in this area. The 2025 plan and Alternate 12 showed the best result in this category.

An analysis of travel times was also included to determine the differences between various networks. This analysis looked at the average travel time from various locations around the City. Due to the similarity with all the networks, the average travel times were nearly identical for each alternative network reviewed.

A graph was created to look at the cost of the various networks against the percentage reduction in roads with LOS D, E and F (as compared to the no-build network). This graph seems to narrow down the logical choices to only two alternatives. Alternative 12 shows best reduction, albeit at the highest cost. The CGBN shows less reduction in the lower levels of service, but it does show a good rate of doing so at a lower cost. All other alternatives fall below the line created by these two alternates, suggesting less attractive options are provided based on this criterion.

In order to look at the impacts of the various additions to the CGBN, the various improvements identified by the Planning Commission and Technical Committee were modeled individually and the resulting traffic changes were noted graphically. The maps show streets that either gained traffic or lost traffic due to the improvement, with the width of the lines indicating the relative changes in traffic volume.

Based on the fact that the 2025 network has one of the lowest average trip times and one of the best benefit to cost ratios of the final alternatives, we recommend that the 2025 plan continue to be the base transportation network used in the Long Range Transportation Plan. The 2030 land use adds additional area to the City limits, along with increased numbers of trips and miles traveled, As Chairman Carlson pointed out, it makes sense that additional street improvements are justified to go along with these increases.

Public Works recommends that the additional roadway improvements identified in the Continuing Growth Base Network (above those in the 2025 network) also be included as the preferred alternative (Alternative 12, as shown). We would also recommend including the six-laning of O Street (as recommended by the MPO Technical Committee) and Cornhusker Highway in the preferred alternative.

By six-laning Cornhusker Highway, an inner ring road is completed that will move traffic efficiently around the edge of the existing urban core. The O Street improvement will allow for improved flow into the downtown area, which is expected to remain a focal point of the community even as the City edges grow farther away. While the intersection improvements that are suggested do not show any benefits within the model (since the model analyzes traffic on a macroscopic scale, ignoring intersections), these intersections are known to have safety and efficiency problems today and will need to be improved in order to be able to handle the higher future volumes of traffic that are expected to traverse these intersections. The other additions were four segments of 2+1 streets needed to serve expected growth areas.